

Claims

I CLAIM:

1. A self-adjusting fluid surface skimmer, comprising:
  - an intake assembly defining an intake passageway, the assembly comprising a first section having an exterior surface and defining an intake opening, a second section, and a flexible coupling connecting the first and second sections;
  - a collar disposed on the exterior surface of the first section near the intake opening;
  - at least one buoyant member attached to the collar;
  - an outlet passage having upper and lower ends, the lower end defining an opening in fluid communication with the second section of the intake assembly;
  - and
  - a gas inlet disposed in the outlet passage.
2. The self-adjusting fluid surface skimmer in accordance with claim 1, wherein the collar defines a circumferential opening and the collar is disposed around the first section.
3. The self-adjusting fluid surface skimmer in accordance with claim 1, wherein the flexible coupling enables pivoting and vertical movement of the first section relative to the second section.

4. The self-adjusting fluid surface skimmer in accordance with claim 1, wherein the at least one buoyant member comprises a plurality of equidistantly spaced buoyant members.

5. The self-adjusting fluid surface skimmer in accordance with claim 1, wherein the gas inlet is disposed between the upper end and the opening in the lower end of the outlet passage.

6. The self-adjusting fluid surface skimmer in accordance with claim 1, wherein the upper end of the outlet passage defines an angled return outlet.

7. The self-adjusting fluid surface skimmer in accordance with claim 1, further comprising a mounting bracket attached to the outlet passage and adapted to secure said skimmer to a tank in a fluid treatment apparatus.

8. A wastewater treatment system, comprising:  
a settling tank comprising a first upper portion and a first lower portion, and defining a first interior chamber;  
an aeration tank disposed within the first interior chamber to define a clearance between the aeration and settling tanks, the aeration tank comprising a second upper portion and a second lower portion, and defining a second interior chamber;

a base disposed in the first interior chamber and below the aeration tank, the base having a length and defining a communicative passageway between the first and second interior chambers;

a raw fluid inlet providing fluid communication with the second interior chamber;

a fluid surface skimmer disposed in the clearance, the skimmer defining a return passageway providing fluid communication between the first and second interior chambers; and

a treated fluid outlet in communication with the first interior chamber.

9. The wastewater treatment system in accordance with claim 8, wherein the first lower portion is conical.

10. The wastewater treatment system in accordance with claim 9, wherein the second lower portion is conical.

11. The wastewater treatment system in accordance with claim 8, wherein the gas supply line extends into the communicative passageway defined by the base.

12. The wastewater treatment system in accordance with claim 8, further comprising a gas diffuser disposed on the gas supply line.

13. The wastewater treatment system in accordance with claim 8, further comprising at least one bracket disposed in the clearance and connecting the aeration and settling tanks.

14. The wastewater treatment system in accordance with claim 13, wherein the at least one bracket comprises first and second brackets, the first bracket extending below the aeration tank and substantially along the length of the base and the second bracket extending below the aeration tank and along only a fraction of the length of the base.

15. The wastewater treatment system in accordance with claim 14, wherein the second bracket is attached to the base above the communicative passageway.

16. The wastewater treatment system in accordance with claim 8, wherein the skimmer comprises an intake assembly defining an intake passageway and having an opening in communication with the first interior chamber, and first and second sections connected by a flexible coupling, an outlet passage in communication with the intake passageway and the second interior chamber, a collar disposed adjacent the opening, and at least one buoyant member attached to the collar.

17. The wastewater treatment system in accordance with claim 8, further comprising a baffle disposed in the treated fluid outlet.

18. The wastewater treatment system in accordance with claim 17, wherein the treated fluid outlet further comprises a recycle passageway in communication with the first interior chamber and positioned to direct flow of said wastewater toward the skimmer.

19. The wastewater treatment system in accordance with claim 8, wherein first and second sections of the first and second upper portions diverge to increase the clearance.

20. A wastewater treatment system, comprising:

- a settling tank comprising a first upper portion, a first lower portion, and defining a first interior chamber;
- an aeration tank disposed within the first interior chamber to define a clearance between the aeration and settling tanks, the aeration tank comprising a second upper portion and a second lower portion, and defining a second interior chamber;
- a base disposed in the first interior chamber and below the aeration tank, the base defining a communicative passageway between the first and second interior chambers;
- a plurality of brackets disposed in the clearance and connecting the aeration and settling tanks;
- a raw fluid inlet providing fluid communication with the second interior chamber;

a fluid surface skimmer disposed in the clearance, the skimmer comprising an intake passage having an opening in fluid communication with the first interior chamber and first and second passageways connected by a flexible coupling, an outlet passage in communication with the intake passage and the second interior chamber, a collar disposed around the opening, at least one buoyant member attached to the collar, and a gas inlet disposed on the outlet passage;

a gas supply line having a first portion extending into the second interior chamber and a second portion attached to the gas inlet of the skimmer; and

a treated fluid outlet in communication with first interior chamber.